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Low Levels of Lead Linked to 765 Million Lost IQ Points in Kids 5 and Under

Researchers who developed a modeling study to estimate the global burden of low-level lead exposure, including the cost of IQ loss and cardiovascular disease mortality, found that exposure led to 765 million lost IQ points in children under 5 years and 5.5 million deaths in adults due to heart disease.

By Dr. Joseph Mercola

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Story at a glance:

- A paper presented at the American Association for the Study of Liver Diseases (AASLD) — The Liver Meeting in November suggests a link between exposure to environmental toxins, including low levels of lead, and liver scarring that can lead to liver disease and cancer.
- The researchers found that the number of people with advanced liver fibrosis has risen, and the risk factors varied by race and ethnicity, highlighting the theory that chronic disease may be driven, at least in part, by environmental factors.
- A second 2023 study found low-level lead exposure was associated with 765 million lost IQ points in children aged 5 and younger and 5.5 million deaths in adults due to cardiovascular disease.
- Risks are also multigenerational, meaning that exposure during pregnancy can lead to epigenetic changes in DNA methylation patterns in grandchildren. Your first step is to be tested and work with a healthcare practitioner who is adept at removing lead without causing more harm.

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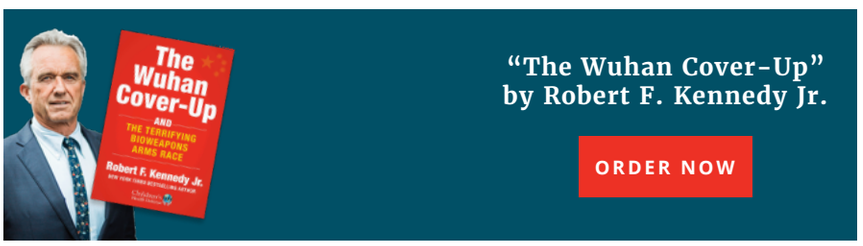
- Avoid consuming more lead by testing for, and filtering out, lead in your cooking and drinking water; by testing older house paint for lead; and by being mindful not to buy or use household products that may contain lead, such as medicine, cosmetics and children's toys.

A paper presented at the AASLD — The Liver Meeting in November, suggests a link between exposure to environmental toxins, including low levels of lead, and liver scarring that can lead to liver disease and cancer.

As Andrea Branch, a professor of medicine at Mount Sinai's School of Medicine in New York, notes, lead is nearly ubiquitous, but not distributed equally in the environment.

Lead use began early in human history, used to thicken and change the opacity of paint. In the U.S. peak paint use occurred in the 19th century. Homes built before 1978 typically had some trace of lead-based paint.



For decades, lead, in the form of tetraethyl lead, was also used in gasoline as an anti-knock agent. Leaded gasoline helped engines run smoothly but released devastating amounts of toxic metal into the environment.

The U.S. began phasing out leaded gasoline in the 1970s, but lead poisoning remains a major health challenge. Sadly, lead wasn't the only gasoline additive that could have been used — 10% alcohol burned cleanly and eliminated soot emissions.

However, as explained in the video below, depending on how much is added, an alcohol additive could lower up to 20% of petroleum profits.

On the other hand, by adding lead to gasoline, the oil industry had a product it could control. The 30-minute film details how corruption caused lead contamination of the environment and poisoned the population.

To raise profits, the industry created health problems that researchers, scientists and doctors have been struggling to study and treat for well over 50 years.

Low-level lead exposure linked to liver injury in African Americans

Branch and her research team evaluated blood samples of 36,092 adults from the National Health and Nutrition Examination Survey (NHANES) (1999-2018).

Information from the blood samples included data on lead, cadmium, mercury and 34 polychlorinated biphenyls, or PCBs. There were 7,360 blood samples that also had data on telomere length.

The researchers compared blood samples with the results of another group of individuals with metabolic dysfunction-associated steatotic liver disease (MASLD).

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In 2023, the term nonalcoholic fatty liver disease, or NAFLD, was officially replaced with MASLD.

The researchers found that cadmium, which is found in products such as cigarette smoke, batteries, pigments and some chocolates, was associated with liver injury in the cohorts.

In further analysis, they also found that African Americans demonstrated liver scarring that was proportional to their blood lead levels. The higher the lead level in the blood sample, the more advanced the individual's liver injury and scarring.

Earlier in 2023, Branch and her colleagues published a study that analyzed data on 47,422 participants from the same NHANES data.

From this, they estimated the number of individuals with advanced liver fibrosis was nearly threefold higher than previous data had indicated.

Additionally, the prevalence was higher in non-Hispanic Black and Mexican-American persons.

They concluded that the number of individuals with advanced liver fibrosis had risen and that the risk factors also varied by race and ethnicity.

Although it has been well documented that low-income communities have a higher burden of pollution, Branch found the data showed African American participants had higher blood serum levels of nearly all toxins that are associated with liver disease.

A 2021 analysis showed that African American patients were less likely to be placed on a liver transplant list and had an increased potential for liver-related death compared to white patients.

Branch noted that although a lack of adequate healthcare is likely one factor, she questions whether the disease may just look different depending on the patient.

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Is chronic disease driven by environmental exposure?

The newest data builds on the paper from earlier in 2023 and while it doesn't prove that low-level exposure causes liver damage, it highlights the growing theory that the "chronic disease epidemic might be driven at least in part by the very environments we inhabit."

In addition to the connection between lead exposure and liver scarring, the data also showed there was a link with shorter telomeres.

These are the end caps on chromosomes that contribute to disease as they shorten with age. The data show that participants with shorter telomeres and higher lead exposure were more likely to have advanced liver fibrosis.

However, as Wei Perng, an associate professor of epidemiology at Colorado School of Public Health noted, she wasn't clear why the researchers connected telomere length with liver scarring and toxin exposure.

She hypothesized that the combination of shorter telomeres and overall environmental exposures may be more powerful. Another researcher also noted that telomeres are not commonly associated with liver fibrosis.

However, that may not mean they aren't associated, only that the association has not yet been made.

Lead contributes to 5.5 million global deaths annually

While Branch's data identified a potentially higher risk to African Americans, a second 2023 study published in the Lancet Planetary Health, quantified the global effect of lead poisoning.

The researchers used blood level estimates from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2019.

This study described several health effects related to lead exposure, including chronic kidney disease, idiopathic developmental intellectual disability and cardiovascular disease.

However, the GBD 2019 study only estimated lead-induced mortality from heart disease based on lead causing increased blood pressure and no other factor.

The estimate for idiopathic developmental intellectual disability did not tally with the effect lead has on intelligence quotient (IQ) in children. These factors suggested that the full effect of lead poisoning may have been underestimated.

Using the same data, researchers developed a modeling study to estimate the global burden, including the cost of IQ loss and cardiovascular disease mortality.

They found that exposure led to 765 million lost IQ points in children under 5 years and 5.5 million deaths in adults due to heart disease.

The vast majority of that loss occurred in low-income and middle-income countries.

The numbers suggested that the global burden of lead exposure has been significantly underestimated and the IQ loss was 80% higher than the previous estimate. The deaths were six times higher than the estimate in the GBD 2019 study and the team calculated the global financial cost at $6 trillion in 2019.

Lead levels in adults and children linked to increased risk

A 2020 report from UNICEF and Pure Earth found "It is clear from evidence compiled that lead poisoning is a much greater threat to the health of children than previously understood."

The report stated that roughly 1 in 3 children has levels above 5 micrograms per deciliter (µg/dL), which is approximately 800 million children worldwide, nearly half of whom live in South Asia.

However, the U.S. Centers for Disease Control (CDC) uses a blood reference value of 3.5 µg/dL to identify children with potentially dangerous lead levels. If 3.5 µg/dL is used as a cutoff, the number of children who have high blood lead levels would be even higher.

A 2018 study showed that lead levels in adults are strongly correlated with a higher risk of death, especially from heart complications, and 18% of deaths and 28.7% of cardiovascular deaths are related to lead toxicity.

They concluded, "Low-level environmental lead exposure is an important, but largely overlooked, risk factor for cardiovascular disease mortality in the USA."

Other health conditions linked to lead exposure include cognitive impairment, attention-related behavioral problems, poor attention span, headache, impotence and reduced cognitive performance.

The World Health Organization has determined that while the CDC and others have lead level cutoffs for exposure, there is no safe level of lead exposure.

Lead is a powerful neurotoxin that even at low levels can interfere with cognitive development and lead to lower IQ scores, shortened attention spans and potentially increased violent and criminal behavior later in life.

Lead health risks are multigenerational

Based on the data that nearly 18% of all deaths and 28.7% of all cardiovascular deaths are related to lead toxicity, it would make sense that patients would routinely have their lead levels checked. Yet, that rarely happens. Instead, patients with symptoms of heart disease are simply given medication.

This is an egregious error since lead exposure also has multigenerational effects. This means that lead not only places the individual at risk, but it also influences their children and grandchildren, especially if the individual is female.

Doug Ruden, director of epigenomics at Wayne State University, was one of the researchers in a 2015 study demonstrating environmental exposure to lead in pregnancy could lead to epigenetic changes in DNA methylation patterns in grandchildren.

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He explained the changes and effects to The Allegheny Front:

> "If the mothers had high blood lead levels when they were born, then their grandchildren have changes in their DNA. And the changes in the DNA we were looking at weren't permanent changes. They're what we call epigenetic mutations.
>
> "The way you think about it is — if a mother is pregnant with a baby, she's also carrying the baby's children too. Because it's like a Russian doll. All of the eggs that a person has in life are actually developed in the fetus, during the fetal period, and all the sperm progenitor cells in the boy babies, the boy fetuses, are also present in the fetus."

How to get lead out of your body and avoid further poisoning

Your first step to lead detoxification is to be tested. Ideally, children at ages 1 and 2 and then again at ages 3 and 4 should be tested for lead levels. According to the CDC, a lead level of 3.5 µg/dL or higher in children and according to the Adult Blood Lead Epidemiology and Surveillance, or ABLES, a level of 5 µg/dL or higher in adults is considered dangerous.

If you find you have elevated lead levels, you should work with a qualified healthcare practitioner who can help remove the toxin without creating more harm as it leaves. One option is chelation therapy using edetate disodium (EDTA), an agent that binds with calcium and some heavy metals.

EDTA can also release important minerals from the body and so should only be used under the care of a physician who monitors your nutritional status and makes the appropriate recommendations.

Another option is an N-acetyl-cysteine, or NAC, which is a precursor to glutathione that your body uses for efficient detoxification. Finally, sauna bathing is another nontoxic strategy that can help remove most toxins from your body, including lead.

Also, remember that to successfully eliminate lead permanently, you must stop adding more. Some of the primary sources of lead in your home are drinking water, cigarette smoke, cosmetics, medicine and lead-based paint in older homes and cheaply made household objects and children's toys.

Read labels and do internet searches to determine whether a product in question has lead in it.

Consider having your water tested and choosing a high-quality filter rated for lead removal.

Always use filtered cold water for drinking or cooking and never cook or mix infant formula with unfiltered hot water from the tap. For information about lead-containing products and recalls, see the Consumer Products Safety Commission's website.

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The views and opinions expressed in this article are those of the authors and do not necessarily reflect the views of Children's Health Defense.

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